

RiceTec is a hybrid rice seed company

- RT has been producing mechanized hybrid rice seed since 1987
- Producing & selling hybrid seed requires an intimate understanding of pollen movement
 - Since 1987 we have conducted over 300 pollen management and stigma viability studies where the acreage exceeded 20 acres per experiment
 - Wind driven rice pollen moves over 600 feet
- RT- Mechanized hybrid rice seed production requires male pollen to routinely move 20 to 24 feet
 - RT – studies show no significant seed yield reductions with pollen movement up to 60 feet
- Hybrid seed corn production requires pollen to routinely move 8 feet
 - Both crops use helicopters to assist pollen movement

RiceTec small scale trial work conducted in 1999 using purple rice to quantify rice pollen movement



RiceTec small scale trial work conducted in 2000 using proprietary male lines to quantify rice pollen movement



RiceTec small scale trial work conducted in 2001 using proprietary male lines to quantify rice pollen movement



The light colored clouds below the helicopter are male rice pollen in a hybrid seed production field



To establish criteria for responsible management of rice pollen movement requires:

□ Thresholds for each stage of Line Development & Product Increase

- Trait Transfer
- Breeding
- Line increasing
 - Core
 - Foundation
- Small Scale Production
- Commercialization

□ The Decision Criteria for each stage needs to include:

- Land Selection
 - Rotation
 - Isolation
- Grower Selection
- Equipment
- Cultural Practices
- Seed Storage
- Seed Disposal
- Monitor/Track/Label
- Inspections
- Testing/ Evaluation
- Training/Education

Testing & Evaluation Protocols must be established to ensure pollen movement is quantified

- ❑ Baseline
 - Internal Germplasm
 - External Germplasm
- ❑ Trait Transfer
- ❑ Breeding Process
 - By line
- ❑ Core Seed
- ❑ Foundation Seed
- ❑ Commercial Product
 - By hybrid



Testing & Evaluation Protocols for pollen management should include:

- ❑ DNA based
 - PCR
 - RT-PCR
- ❑ ELISA
 - Strip Testing
 - Wet Lab Testing
- ❑ Phenotypic
 - Growouts
 - Tolerance to chemical application



Process Management is essential for successful pollen management

RiceTec		RELEASED	Work Instruction
SUBJECT: Making Crosses	Document: B2-01-WI	EFFECTIVE DATE: 2/4/2003	
APPLICABLE TO: Research	VERSION: 1.0	AUTHOR: Clemencia Pittman	
CROSSFUNCTIONAL APPROVAL: Approved 12/5/2002	MANAGEMENT APPROVALS: (2 of 2) Melanie Roebuck, Larry Haugen	EXECUTIVE APPROVAL: Mark Walkone	

1. PURPOSE AND SCOPE

- 1.1 To outline the methods available to cross male and female rice plants in the greenhouse or in the field.

2. REFERENCES AND DEFINITIONS

- 2.1 Jennings, P.R., "Rice Improvement" 1979., International Rice Research Institute.
- 2.2 Fehr, W. R., "Artificial Hybridization and self-Pollination" In, Hybridization of Crop Plants Editors Herrera and Coffman, 1980., American Society of Agronomy- Crop Science Society of America.

3. RESPONSIBILITIES

- 3.1 Breeder- (B) selection of the parents.
- 3.2 Research assistant (RA) or breeder make the crosses.

4. ACTION STEPS

■ ISO9000/QMS

- SOP/WI for each decision
- Testing & Evaluation Protocols are incorporated into SOP/WI
- Employee training for each SOP/WI
- SOP/WI are fully integrated into daily activities
- Includes methods for corrective action

Routine Process Management audits validate compliance to QMS

□ Internal

- Quality Management System is embedded into SOP/WI
- Accountability & Responsibility for QMS, compliance to QMS & changes to QMS are clearly established
 - "Gate Keeper"

□ External

- Routine audits conducted by QMS industry experts
 - Flags noncompliance and recommends opportunities for improvement

Hybrid corn production processes use helicopters to assist male pollen to travel 8 – 10 feet



1 Male row to 4 female rows & rows are 30 inches apart